Texas-New Mexico
Power Company®

TNP ONE GENERATING STATION

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February 4, 2000

Mr. William Grimly / Ms. Lara Autry
Emissions Measurement Center (MD-19)
U.S. Environmental Protection Agency
Research Triangle Park, N.C. 27711

Dear Mr. Grimly and Ms. Autry:

In response to the U.S. Environmental Protection Agency Mercury Information collection Request for electric utilities, mercury speciation stack testing at Texas-New Mexico Power Company, TNP-One Power Plant, Unit Number 2 were conducted on October 6, 7, and 8, 1999.

Find enclosed two (2) copies of the Source Emissions Survey conducted on Unit number 2 Baghouse Primary Inlet Duct and Stack.

If you have any questions or need additional information please contact me at (254) 746-7604 ext. 378

Very truly yours,
Texas-New Mexico Power Company

Eddy Young
Technical Support

cc: George Faulkner W/O enclosure

METCO ENVIRONMENTAL
P.O. Box 598
Addison, TX 75001
(972) 931-7127

SOURCE EMISSIONS SURVEY
OF
TEXAS-NEW MEXICO POWER COMPANY
TNP-ONE
UNIT NUMBER 2 BAGHOUSE PRIMARY INLET DUCT
AND STACK
BREMOND, TEXAS

OCTOBER 1999

FILE NUMBER 99-186

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1 INTRODUCTION

1.1 Summary of Test Program

METCO Environmental, Dallas, Texas, conducted a source emissions survey of Texas-New Mexico Power Company, TNP-One, located in Bremond, Texas, on October 6, 7, and 8, 1999. The purpose of these tests was to meet the requirements of the EPA Mercury Information Request. Speciated mercury concentrations at the Unit Number 2 Baghouse Primary Inlet Duct, speciated mercury emissions at the Unit Number 2 Stack, and mercury and chlorine content of the fuel were determined. The sulfur, ash, and Btu content of the fuel were also determined.

The sampling followed the procedures set forth in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, Methods 1, 2, 3B, 4, 5, 17, and 19; in the Ontario Hydro Method, Revised July 7, 1999; and ASTM Methods D2234, D6414-99, D2361-95, D-0516, D-3174, and D-3286.

1.2 Key personnel

Mr. Bill Hefley of METCO Environmental was the onsite project manager. Mr. Shane Lee, Mr. Mike Bass, Mr. Jason Conway, Mr. Scott Hart, and Mr. Jason Brown of METCO Environmental performed the testing.

Mr. Eddy Young of Texas-New Mexico Power Company acted as the utility representative, performing process monitoring and sampling.

Table 1-1
Test Program Organization

Organization	Individual	Responsibility	Phone Number
Project Management and Oversight			
METCO	Bill Mullins	Project Director	(972) 931-7127
Project Team			
METCO	Bill Hefley	Project Manager	(972) 931-7127
Utility			
Texas-New Mexico Power Company	Eddy Young	Utility Representative	(254) 746-7604
QA/QC			
METCO	Jim Monfries	Quality Assurance Manager	(972) 931-7127

2 SOURCE AND SAMPLING LOCATION DESCRIPTIONS

2.1 Process Description

The TNP-One, Unit Number 2, is a ABB-CE/Lurgi, balance draft, circulating fluidized bed combustor which produces 1,100,000 lbs/hr of steam for a Westinghouse steam turbine generator rated at 171 gross megawatts. This unit was constructed in 1990. High pressure fluidizing air accelerates through the perforated furnace bottom, floating or fluidizing the burning coal ash and limestone throughout the furnace. A fluidized bed boiler eliminates the need for a scrubber. Limestone is introduced directly into the furnace combustion chamber where it chemically reacts with sulfur in the coal.

Furnace temperature is controlled at approximately 1,600 °F, which optimized two chemical reactions required for sulfur removal. Heating the limestone produces lime and carbon dioxide. Sulfur dioxide produced when burning the coal reacts with lime to produce anhydrous calcium sulfate (gypsum).

The resulting flow of gases and solids exit the furnace through four primary cyclones, recirculating the larger unburned fuel, ash, and reagent particles through the fluid bed heat exchanger to be reinjected into the boiler's fluidized bed. This mass recirculation back to the furnace provides more complete carbon and limestone utilization. Due to the high solids recirculation, a uniform temperature is achieved throughout the furnace.

2.2 Control Equipment Description

Air pollution control equipment consists of Utility Engineering Company designed baghouse built by Southwest Public Service Company. A fabric filter is used to collect the flyash that exits the air preheaters. The flyash is collected on the inside of tubular filter bags. The system is a shake-deflate fabric filter and uses a total of 3,024 Teflon-coated fiberglass filter bags distributed in 14 compartments. Design efficiency is 99.78 percent based on an inlet ash loading of 22,000 lbs/hr and an outlet loading of 48.8 lbs/hr.

2.3 Flue Gas and Process Sampling Locations

2.3.1 Inlet Sampling Location

The sampling location on the Unit Number 2 Baghouse Primary Inlet Duct is 40 feet above the ground. The sampling locations are located 10 feet 4 inches (1.10 equivalent duct diameters) downstream from a bend in the duct and 2 feet 10 inches (0.30 equivalent duct diameters) upstream from an expansion in the duct.

2.3.2 Stack Sampling Location

The sampling location on the Unit Number 2 Stack is 243 feet above the ground. The sampling locations are located 194 feet (16.17 stack diameters) downstream from the inlet to the stack and 97 feet (8.08 stack diameters) upstream from the outlet of the stack.

2.3.3 Lignite Sampling Location

The lignite sampling locations are located at the coal feeders to each of the individual mills.

Figure 2-1
Description of sampling locations at TNP-One Unit Number 2 Baghouse Primary Inlet Duct

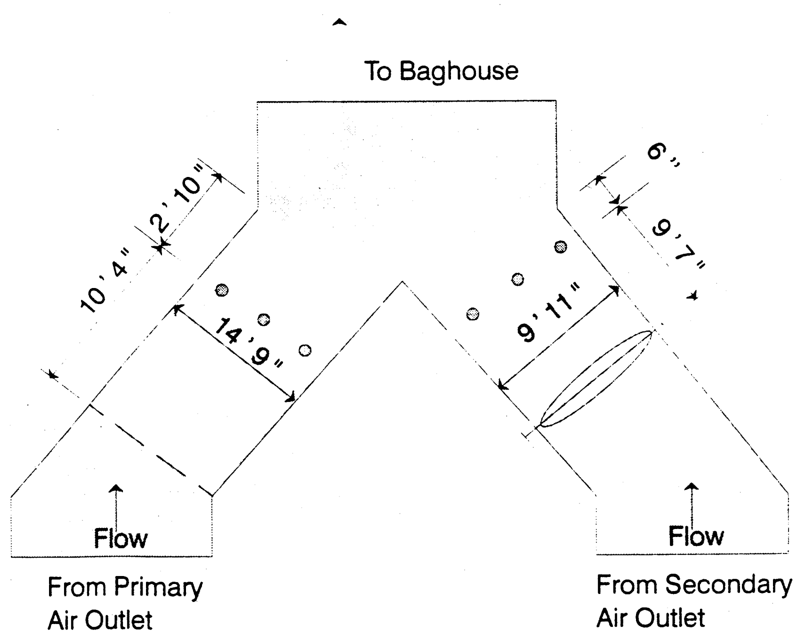


Figure 2-2
Description of sampling points at TNP-One Unit Number 2 Baghouse Primary Inlet Duct

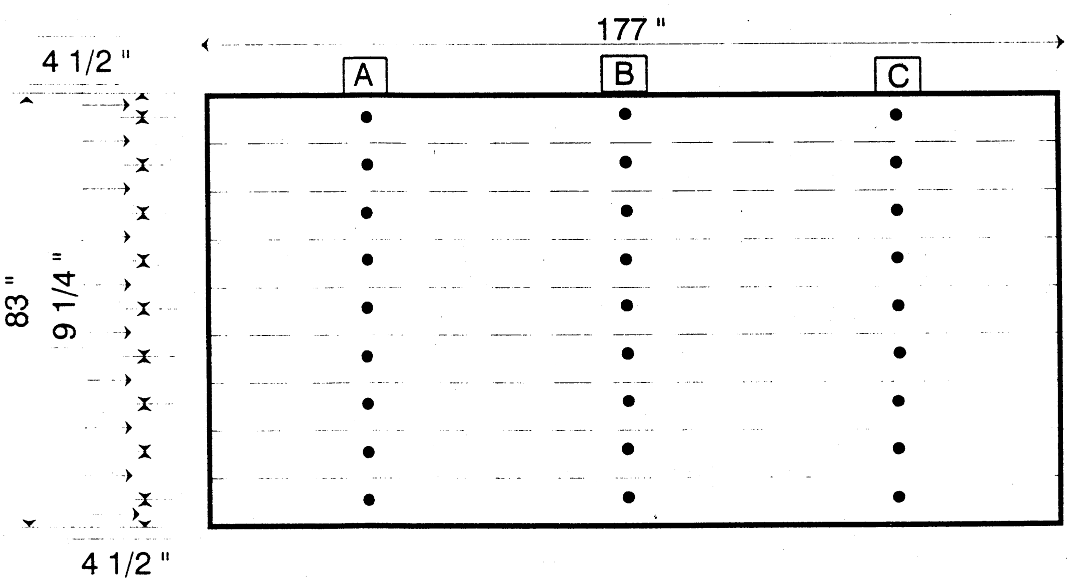


Figure 2-3
Description of sampling locations at TNP-One Unit Number 2 Stack

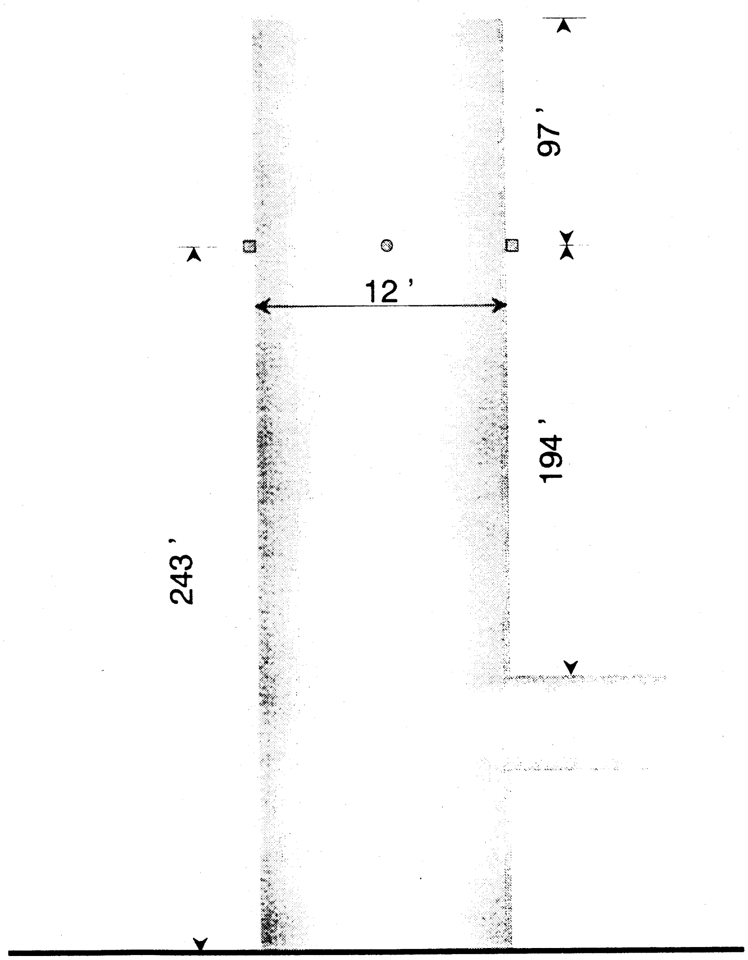
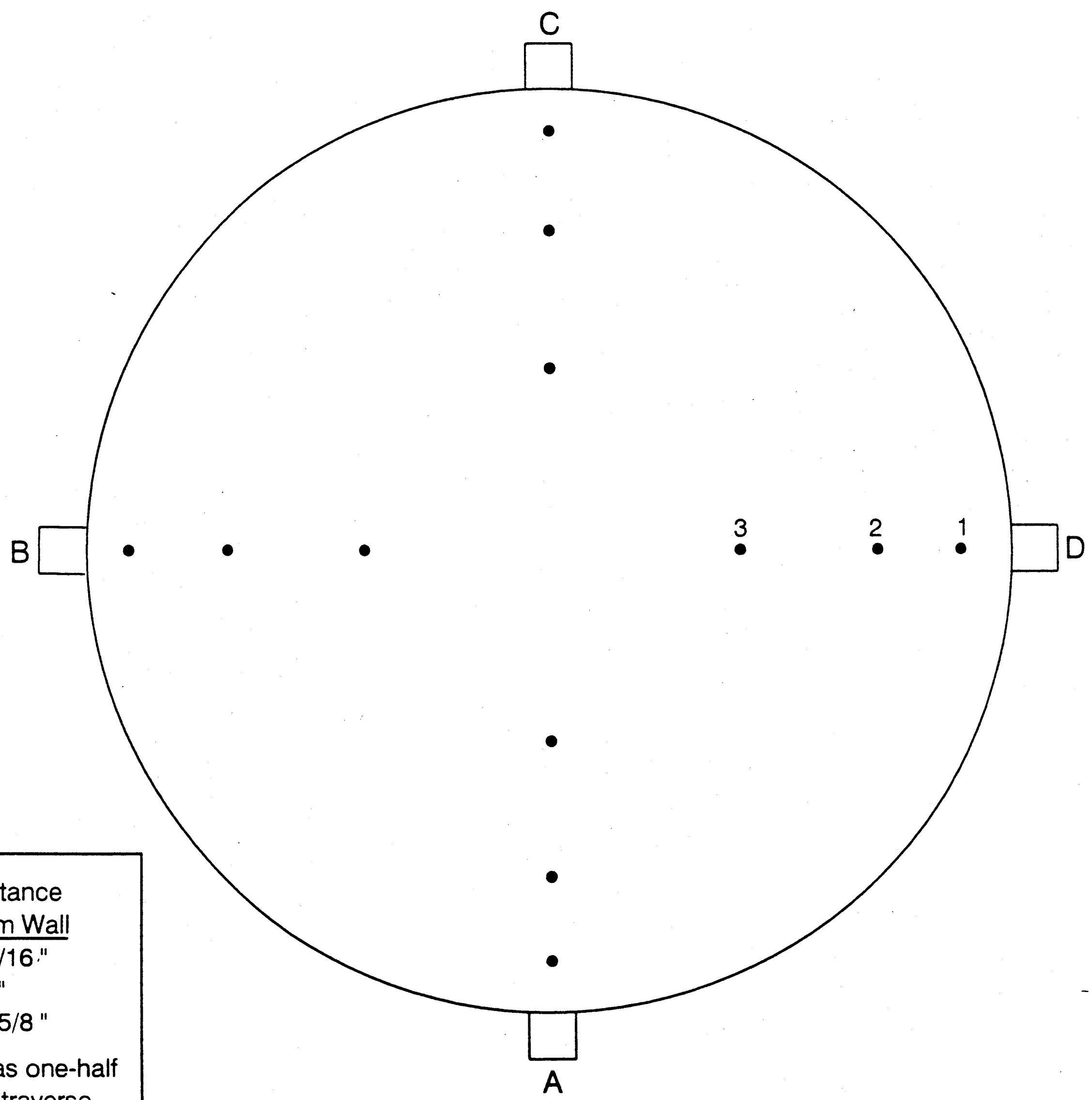


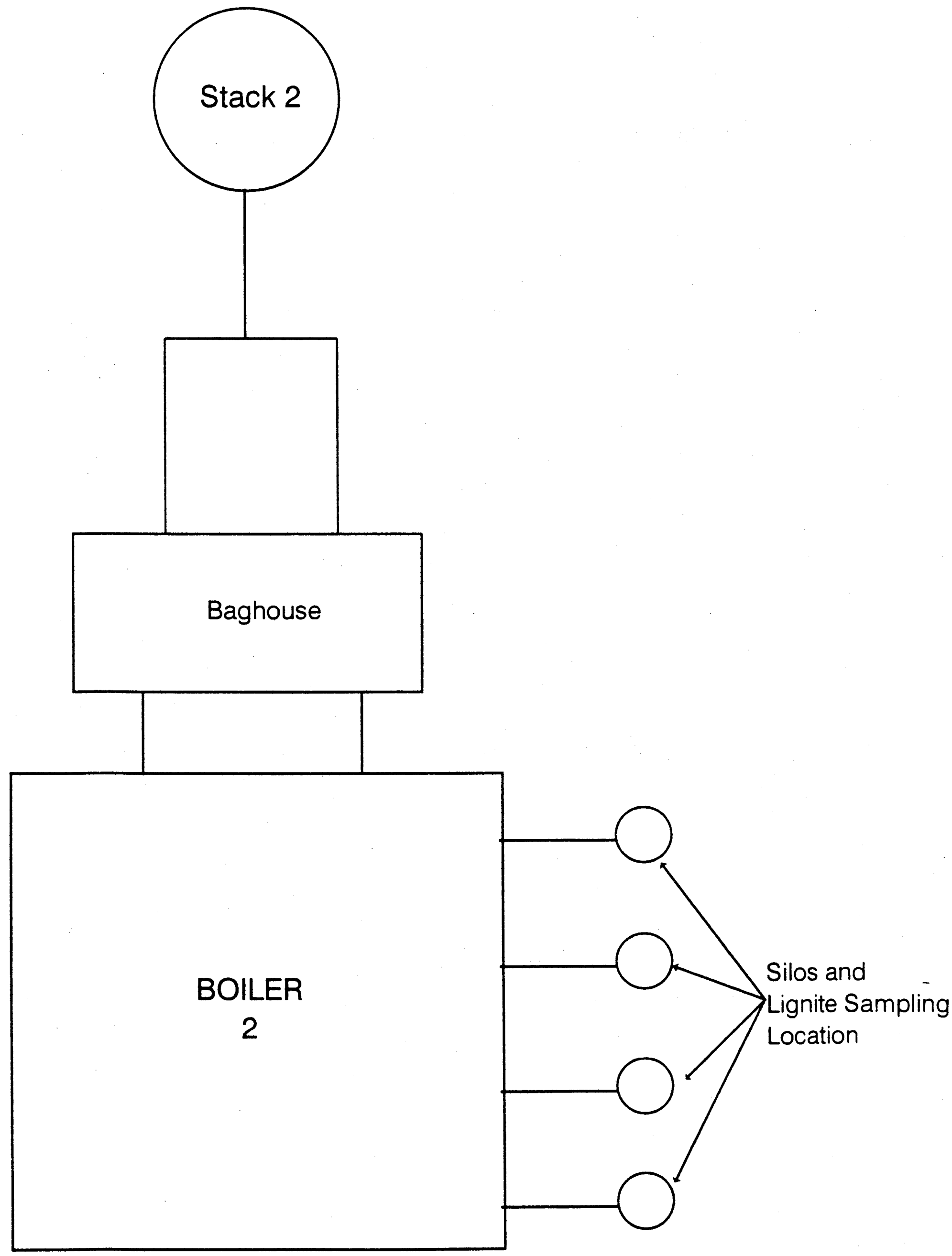
Figure 2-4
Description of sampling points at TNP-One Unit Number 2 Stack



Point*	Distance from Wall
1	6 5/16 "
2	21 "
3	42 5/8 "

*Calculated as one-half of a six point traverse.

Figure 2-5
Description of lignite sampling locations at TNP-One Unit Number 2



3 SUMMARY AND DISCUSSION OF RESULTS

3.1 Objectives and Test Matrix

3.1.1 Objective

The objective of the tests was to collect the information and measurements required by the EPA Mercury ICR. Specific objectives listed in order of priority are:

1. Quantify speciated mercury emissions at the stack.
2. Quantify speciated mercury concentrations in the flue gas at the inlet.
3. Quantify fuel mercury and chlorine content during the stack and inlet tests.
4. Provide the above information for use in developing boiler, fuel, and specific control device mercury emission factors.

3.1.2 Test Matrix

The test matrix is presented in Table 1. The table includes a list of test methods to be used. In addition to speciated mercury, the flue gas measurements include moisture, flue gas flow rates, carbon dioxide, and oxygen.

Table 3-1
Test Matrix for Mercury ICR Tests at TNP-One Unit Number 2

Sampling Location	No. of Runs	Species Measured	Sampling Method	Sample Run Time	Analytical Method	Analytical Laboratory
Stack	3	Speciated Hg	Ontario Hydro	120 min	Ontario Hydro	TestAmerica
Stack	3	Moisture	EPA 4	Concurrent	Gravimetric	METCO
Stack	3	Flue Gas Flow	EPA 1 & 2	Concurrent	Pitot Traverse	METCO
Stack	3	O_2 & CO_2	EPA 3B	Concurrent	Orsat	METCO
Inlet	3	Speciated Hg	Ontario Hydro	135 min	Ontario Hydro	TestAmerica
Inlet	3	Moisture	EPA 4	Concurrent	Gravimetric	METCO
Inlet	3	Flue Gas Flow	EPA 1 & 2	Concurrent	Pitot Traverse	METCO
Inlet	3	O_2 & CO_2	EPA 3B	Concurrent	Orsat	METCO
Coal Feeders	3	Hg, Cl, Sulfur, Ash, and Btu/lb in coal	ASTM D2234	1 grab sample every 30-minutes per mill per run	ASTM D6414-99 (Hg), ASTM D2361-95 (Cl), ASTM D-0516 (S), ASTM D-3174 (Ash), and ASTM D-3286 (Btu/lb)	TestAmerica and Philip Services

3.2 Field Test Changes and Problems

Only the baghouse primary inlet duct was sampled due to a flue gas damper located in the sampling plane of the secondary inlet duct.

3.3 Summary of Results

The results of the tests performed at TNP-One Unit Number 2 are listed in the following tables.

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Table 3-2
TNP-One Unit Number 2 Source Emissions Results

Run Number	**1**	**2**	**3**
Test Date	10/07/99	10/07/99	10/08/99
Test Time	1240-1517	1647-2000	0736-1010
Inlet Gas Properties (Primary Duct)			
Flow Rate - ACFM	352,185	383,652	367,726
Flow Rate – DSCFM*	178,509	199,562	189,641
% Water Vapor - % Vol.	15.31	13.16	15.08
CO_2 - %	14.6	14.2	15.3
O_2 - %	5.2	5.4	4.4
% Excess Air @ Sampling Point	32	34	26
Temperature - °F	363	358	351
Pressure – "Hg	27.81	27.66	27.81
Percent Isokinetic	102.9	93.8	96.2
Volume Dry Gas Sampled – DSCF*	52.834	53.848	52.499
Stack Gas Properties			
Flow Rate – ACFM	625,925	618,457	621,396
Flow Rate – DSCFM*	344,391	343,932	345,882
% Water Vapor - % Vol.	13.33	11.99	13.54
CO_2 - %	13.8	14.4	15.0
O_2 - %	6.0	5.4	4.8
% Excess Air @ Sampling Point	39	34	29
Temperature - °F	351	352	340
Pressure – "Hg	29.07	28.97	29.08
Percent Isokinetic	97.1	95.9	100.7
Volume Dry Gas Sampled – DSCF*	58.349	57.562	60.818

* 29.92 "Hg, 68 °F (760 mm Hg, 20 °C)

Table 3-3
TNP-One Unit Number 2 Mercury Removal Efficiency

Run Number	**1**	**2**	**3**	**Average**
Test Date	10/07/99	10/07/99	10/08/99	
Test Time	1240-1517	1647-2000	0736-1010	
Total mercury				
Inlet - lb/10^{12} Btu	27.15	15.29	35.20	25.88
Stack - lb/10^{12} Btu	12.17	7.03	13.43	10.87
Removal efficiency - %	55.2	54.0	61.8	57.0
Particulate mercury				
Inlet - lb/10^{12} Btu	15.57	7.66	20.22	14.48
Stack - lb/10^{12} Btu	0.03	0.02	0.04	0.03
Removal efficiency - %	99.8	99.7	99.8	99.8
Oxidized mercury				
Inlet - lb/10^{12} Btu	6.24	3.24	9.91	6.46
Stack - lb/10^{12} Btu	8.73	4.88	9.75	7.79
Removal efficiency - %	-----	-----	1.6	-----
Elemental mercury				
Inlet - lb/10^{12} Btu	5.34	4.38	5.06	4.93
Stack - lb/10^{12} Btu	3.41	2.12	3.64	3.06
Removal efficiency - %	36.1	51.6	28.1	38.6

Table 3-4
TNP-One Unit Number 2 Mercury Speciation Results

Run Number	1	2	3	Average
Test Date	10/07/99	10/07/99	10/08/99	
Test Time	1240-1517	1647-2000	0736-1010	
Inlet Mercury Speciation (Primary Duct)				
Particulate mercury – ug	28.42	14.07	38.55	—
ug/dscm	19.00	9.23	25.93	18.05
lb/10^{12} Btu	15.57	7.66	20.22	14.48
% of total Hg	57.3	50.1	57.4	54.9
Oxidized mercury – ug	11.40	5.96	18.90	—
ug/dscm	7.62	3.91	12.71	8.08
lb/10^{12} Btu	6.24	3.24	9.91	6.46
% of total Hg	23.0	21.2	28.2	24.1
Elemental mercury - ug	9.74	8.05	9.65	—
ug/dscm	6.51	5.28	6.49	6.09
lb/10^{12} Btu	5.34	4.38	5.06	4.93
% of total Hg	19.7	28.6	14.4	20.9
Total mercury – ug	49.56	28.08	67.10	—
ug/dscm	33.13	18.42	45.14	32.23
lb/10^{12} Btu	27.15	15.29	35.20	25.88
Stack Mercury Speciation				
Particulate mercury – ug	0.053	0.045	0.076	—
ug/dscm	0.03	0.03	0.04	0.03
lb/10^{12} Btu	0.03	0.02	0.04	0.03
% of total Hg	0.2	0.3	0.3	0.3
Oxidized mercury – ug	16.70	9.59	21.0	—
ug/dscm	10.11	5.88	12.19	9.39
lb/10^{12} Btu	8.73	4.88	9.75	7.79
% of total Hg	71.7	69.4	72.6	71.2
Elemental mercury – ug	6.53	4.16	7.85	—
ug/dscm	3.95	2.55	4.56	3.69
lb/10^{12} Btu	3.41	2.12	3.64	3.06
% of total Hg	28.0	30.2	27.1	28.4
Total mercury – ug	23.28	13.80	28.93	—
ug/dscm	14.09	8.47	16.80	13.12
lb/10^{12} Btu	12.17	7.03	13.43	10.88
Coal Analysis				
Mercury - ppm dry	0.222	0.180	0.362	0.255
Mercury - lb/10^{12} Btu	32.84	25.63	57.52	38.66
Chlorine - ppm dry	300	<100	<100	<167
Moisture - %	29.4	28.5	30.2	29.4
Sulfur - % dry	1.27	1.26	1.43	1.32
Ash - % dry	26.1	23.1	30.7	26.6
HHV - Btu/lb as fired	6,720	7,010	6,280	6,670
Coal flow - lb/hr as fired	235,600	222,600	246,400	234,867
Total Heat Input – 10^6 Btu/hr	1,583.2	1,560.4	1,547.4	1,563.7
Total Mercury Mass Rates				
lb/hr input in coal	0.052	0.040	0.089	0.060
lb/hr at Baghouse inlet	0.022	0.014	0.032	0.023
lb/hr emitted	0.018	0.011	0.022	0.017

Table 3-5
TNP-One Unit Number 2 Process Data

Run Number	1	2	3
Test Date	10/07/99	10/07/99	10/08/99
Test Time	1240-1517	1647-2000	0736-1010
Unit Operation			
Unit Load - MW net	160	160	161
Coal Mills in Service	A, B, C, & D	A, B, C, & D	A, B, C, & D
Coal Flow - tons/hr	117.8	111.3	123.2
Boiler CEMS data			
NO_x – lb/10^6 Btu	0.216	0.223	0.198
SO_2 – lb/10^6 Btu	0.565	0.577	0.574
CO_2 - %	12.62	12.42	12.52
Stack Gas flow – wscfh	24,669,106	23,833,534	24,943,740
Stack Gas Temperature - °F	349	348	336
Fabric Filter data			
Baghouse Δ Pressure - "H_2O	4.7	4.5	5.0
Primary inlet temperature - °F	365	359	350
Secondary temperature - °F	332	354	332
Gas outlet temperature - °F	334	338	323

4 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Emission Test Methods

The sampling followed the procedures set forth in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, Methods 1, 2, 3B, 4, 5, 17, and 19; in the Ontario Hydro Method, Revised July 7, 1999; and ASTM Methods D2234, D6414-99, D2361-95, D-0516, D-3174, and D-3286.

A preliminary velocity traverse was made at each of the three ports at the inlet sampling location, in order to determine the uniformity and magnitude of the flow prior to testing. All traverse points were checked for cyclonic flow and the average angle was equal to 4.4 degrees. Alternate procedures would be required if the angle of cyclonic flow were greater than 20 degrees. Nine traverse points were sampled from each of the three ports, for a total of twenty-seven traverse points.

A preliminary velocity traverse was made at each of the four ports at the stack sampling locations, in order to determine the uniformity and magnitude of the flow prior to testing. All traverse points were checked for cyclonic flow and the average angle was equal to 3.0 degrees. Alternate procedures would be required if the angle of cyclonic flow were greater than 20 degrees. Three traverse points were sampled from each of the four ports for a total of twelve traverse points.

The sampling trains were leak-checked at the end of the nozzle at 15 inches of mercury vacuum before each test, and again after each test at the highest vacuum reading recorded during each test. This was done to predetermine the possibility of a diluted sample.

The pitot tube lines were checked for leaks before and after each test under both a vacuum and a pressure. The lines were also checked for clearance and the manometer was zeroed before each test.

Integrated orsat samples were collected and analyzed according to EPA Method 3B during each test.

4.1.1 Mercury

Triplicate samples for mercury were collected. The samples were taken according to EPA Methods 1, 2, 3B, 4, 5, and 17; and the Ontario Hydro Method, Revised July 7, 1999. For each run at the inlet sampling location, samples of five-minute duration were taken isokinetically at each of the twenty-seven traverse points for a total sampling time of 135 minutes. For each run at the stack sampling location, samples of ten-minute duration were taken isokinetically at each of the twelve traverse points for a total sampling time of 120 minutes. Data was recorded at five-minute intervals. Reagent blanks and field blanks were submitted.

The "front-half" of the sampling train at the inlet sampling location contained the following components:

Teflon Coated Nozzle
In-stack Quartz Fiber Thimble and Backup Filter and Teflon Coated Support
Heated Glass Probe @ > 248°F

The "front-half" of the sampling train at the outlet sampling location contained the following components:

Teflon Coated Nozzle
In-stack Quartz Fiber Filter and Teflon Coated Support
Heated Glass Probe @ > 248°F

The "back-half" of the sampling train at both sampling locations contained the following components:

Impinger Number	Impinger Type	Impinger Contents	Amount	Parameter Collected
1	Modified Design	1 mol/L KCL	100 ml	Oxidized Mercury and Moisture
2	Modified Design	1 mol/L KCL	100 ml	Oxidized Mercury and Moisture
3	Greenburg-Smith Design	1 mol/L KCL	100 ml	Oxidized Mercury and Moisture
4	Modified Design	5% HNO_3 and 10% H_2O_2	100 ml	Elemental Mercury and Moisture
5	Modified Design	4% $KMnO_4$ and 10% H_2SO_4	100 ml	Elemental Mercury and Moisture
6	Modified Design	4% $KMnO_4$ and 10% H_2SO_4	100 ml	Elemental Mercury and Moisture
7	Greenburg-Smith Design	4% $KMnO_4$ and 10% H_2SO_4	100 ml	Elemental Mercury and Moisture
8	Modified Design	Silica	200 g	Moisture

All glassware was cleaned prior to use according toe the guidelines outlined in EPA Method 29, Section 5.1.1 and the Ontario Hydro Method, Revised July 7, 1999, Section 13.2.15. All glassware connections were sealed with Teflon tape.

At the conclusion of each test, the filter and impinger contents were recovered according to procedures outlined in the Ontario Hydro Method, Revised July 7, 1999, Section 13.2.

Mercury samples were analyzed by Cold Vapor Atomic Absorption and Fluorescence Spectroscopy.

4.2 Process Test Methods

A modified ASTM D2234 method of coal sampling was followed. For each test run, a grab sample of coal was collected from each coal feeder to each of the individual mills at thirty-minute intervals. One composite sample was prepared for analysis from the individual feeder samples. Each sample was analyzed for mercury, chlorine, sulfur, ash, and Btu content by ASTM Methods D6414-99, D2361-95, D-0516, D-3174, and D-3286, respectively.

4.3 Sample Tracking and Custody

Samples and reagents were maintained in limited access, locked storage at all times prior to the test dates. While on site, they were at an attended location or in an area with limited access. Off site, METCO and TestAmerica provided limited access, locked storage areas for maintaining custody.

Chain of custody forms are located in Appendix F. The chain of custody forms provide a detailed record of custody during sampling, with the initials noted of the individuals who loaded and recovered impinger contents and filters, and performed probe rinses.

All samples were packed and shipped in accordance with regulations for hazardous substances.

5 QA/QC ACTIVITIES

The major project quality control checks are listed in Table 5-1. Matrix Spike Summaries are listed in Table 5-2. Duplicate and Triplicate Analyses Summaries are listed in Table 5-3. Additional method-specific QC checks are presented in Table 5-4 (Methods 1 and 2), Table 5-5 (Method 5/17 sampling), and Table 5-6 (Ontario Hydro sample recovery and analysis). These tables also include calibration frequency and specifications.

Table 5-1
Major Project Quality Control Checks

QC Check	*Information Provided*	*Results*
Blanks		
Reagent blank	Bias from contaminated reagent	No Mercury was detected
Field blank	Bias from handling and glassware	No Mercury was detected
Spikes		
Matrix spike	Analytical bias	Sample results were between 75% - 125% recovery
Replicates		
Duplicate analyses	Analytical precision	Results were < 10% RPD
Triplicate analyses	Analytical precision	Results were < 10% RPD

Table 5-2
Unit Number 2 Matrix Spike Summary

Sampling Location	*Run Number*	*Container*	*Results (ug)*	*True Value (ug)*	*Recovery (%)*
Inlet Duct	1	4	2.79	2.90	96
Inlet Duct	1	5	3.96	5.10	78
Inlet Duct	3	1A	5.50	5.43	101
Inlet Duct	3	2	0.705	0.730	97
Stack	2	1A	0.049	0.05	98
Stack	2	3	13.0	14.6	89
Reagent Blank	-----	11	1.02 ug/L	1.0 ug/L	102

Table 5-3
Unit Number 2 Duplicate and Triplicate Analyses Summary

Sampling Location	Run Number	Container	Results (ug)	Duplicate Results (ug)	RPD	Triplicate Results (ug)	RPD
Inlet Duct (Primary)	1	1A	28.4	28.3	0.2	-----	-----
		1B	0.022	0.023	2.5	----	----
		2	<0.270	<0.270	0	<0.210	0
		3	11.4	11.17	2	----	----
		4	<0.580	<0.580	0	----	----
		5	9.74	9.84	1.0	----	----
	2	1A	14.0	13.76	1.4	----	----
		1B	0.065	0.065	0.8	----	----
		2	<0.320	<0.320	0	<0.320	0
		3	5.96	5.99	0.5	----	----
		4	<0.700	<0.700	0	----	----
		5	8.05	7.75	3.8	----	----
	3	1A	38.50	37.76	2.0	----	----
		1B	0.053	0.052	1.9	----	----
		2	<0.146	<0.146	0	----	----
		3	18.9	19.1	0.8	----	----
		4	<0.680	<0.680	0	----	----
		5	9.65	9.70	0.5	----	----
Stack	1	1A	0.053	0.052	1.0	----	----
		2	<0.088	<0.088	0	----	----
		3	16.70	16.52	1.0	----	----
		4	<0.560	<0.560	0	----	----
		5	6.53	6.53	0	----	----
	2	1A	0.045	0.046	1.8	0.046	1.8
		2	<0.066	<0.066	0	----	----
		3	9.59	9.67	0.8	9.59	0
		4	<0.600	<0.600	0	----	----
		5	4.16	4.19	0.7	----	----
	3	1A	0.076	0.076	0	----	----
		2	<0.068	<0.068	0	----	----
		3	21.00	21.02	0.3	----	----
		4	<0.640	<0.640	0	----	----
		5	7.85	7.80	0.6	----	----

Table 5-4
QC Checklist and Limits for Methods 1 and 2

Quality Control Activity	Acceptance Criteria and Frequency	Reference
Measurement site evaluation	>2 diameters downstream and 0.5 diameters upstream of disturbances*	Method 1, Section 2.1
Pitot tube inspection	Inspect each use for damage, once per program for design tolerances	Method 2, Figures 2-2 and 2-3
Thermocouple	+/- 1.5% (°R) of ASTM thermometer, before and after each test mobilization	Method 2, Section 4.3
Barometer	Calibrate each program vs. mercury barometer or vs. weather station with altitude correction	Method 2, Section 4.4

* Although the inlet sampling location does not meet the requirements of EPA Method 1, three-dimensional flow testing as described in EPA Method 1 was not performed. A preliminary velocity traverse was made at each of the three ports at the inlet sampling location, in order to determine the uniformity and magnitude of the flow prior to testing. All traverse points were checked for cyclonic flow and the average angle was equal to 4.4 degrees

Table 5-5
QC Checklist and Limits for Method 5/17 Sampling

Quality Control Activity	Acceptance Criteria and Frequency	Reference
Pre-mobilization checks		
Gas meter/orifice check	Before test series, Y_D +/- 5% (of original Y_D)	Method 5, Section 5.3
Probe heating system	Continuity and resistance check on element	
Nozzles	Note number, size, material	
Glassware	Inspect for cleanliness, compatibility	
Thermocouples	Same as Method 2	
On-site pre-test checks		
Nozzle	Measure inner diameter before first run	Method 5, Section 5.1
Probe heater	Confirm ability to reach temperature	
Pitot tube leak check	No leakage	Method 2, Section 3.1
Visible inspection of train	Confirm cleanliness, proper assembly	
Sample train leak check	$\leq$0.02 cf at 15" Hg vacuum	Method 5, Section 4.1.4
During testing		
Probe and filter temperature	Monitor and confirm proper operation	
Manometer	Check level and zero periodically	
Nozzle	Inspect for damage or contamination after each traverse	Method 5, Section 5.1
Probe/nozzle orientation	Confirm at each point	
Post test checks		
Sample train leak check	$\leq$0.02 cf at highest vacuum achieved during test	Method 5, Section 4.1.4
Pitot tube leak check	No leakage	Method 2, Section 3.1
Isokinetic ratio	Calculate, must be 90-110%	Method 5, Section 6
Dry gas meter calibration check	After test series, Y_D +/- 5%	Method 5, Section 5.3
Thermocouples	Same as Method 2	
Barometer	Compare w/ standard, +/- 0.1" Hg	

Table 5-6 QC Checklist and Limits for Ontario Hydro Mercury Speciation

Quality Control Activity	Acceptance Criteria and Frequency	Reference
Pre-mobilization activities		
Reagent grade	ACS reagent grade	Ontario Hydro Section 8.1
Water purity	ASTM Type II, Specification D 1193	Ontario Hydro Section 8.2
Sample filters	Quartz; analyze blank for Hg before test	Ontario Hydro Section 8.4.3
Glassware cleaning	As described in Method	Ontario Hydro Section 8.10
On-site pre-test activities		
Determine SO_2 concentration	If >2500 ppm, add more HNO_3-H_2O_2 solution	Ontario Hydro Section 13.1.13
Prepare KCl solution	Prepare batch as needed	Ontario Hydro Section 8.5
Prepare HNO_3-H_2O_2 solution	Prepare batch as needed	Ontario Hydro Section 8.5
Prepare H_2SO_4-$KMnO_4$ solution	Prepare daily	Ontario Hydro Section 8.5
Prepare HNO_3 rinse solution	Prepare batch as needed; can be purchased premixed	Ontario Hydro Section 8.6
Prepare hydroxylamine solution	Prepare batch as needed	Ontario Hydro Section 8.6
Sample recovery activities		
Brushes and recovery materials	No metallic material allowed	Ontario Hydro Section 13.2.6
Check for $KMnO_4$ Depletion	If purple color lost in first two impingers, repeat test with more HNO_3-H_2O_2 solution	Ontario Hydro Section 13.1.13
Probe cleaning	Move probe to clean area before cleaning	Ontario Hydro Section 13.2.1
Impinger 1,2,3 recovery.	After rinsing, add permanganate until purple color remains to assure Hg retention	Ontario Hydro Section 13.2.8
Impinger 5,6,7 recovery.	If deposits remain after HNO_3 rinse, rinse with hydroxylamine sulfate. If purple color disappears after hydroxylamine sulfate rinse, add more permangante until color returns	Ontario Hydro Section 13.2.10
Impinger 8	Note color of silica gel; if spent, regenerate or dispose.	Ontario Hydro Section 13.2.11
Blank samples		
0.1 N HNO_3 rinse solution	One reagent blank per batch.	Ontario Hydro Section 13.2.12
KCl solution	One reagent blank per batch.	Ontario Hydro Section 13.2.12
HNO_3-H_2O_2 solution	One reagent blank per batch.	Ontario Hydro Section 13.2.12
H_2SO_4-$KMnO_4$ solution	One reagent blank per batch.	Ontario Hydro Section 13.2.12
Hydroxylamine sulfate solution	One reagent blank per batch.	Ontario Hydro Section 13.2.12
Unused filters	Three from same lot.	Ontario Hydro Section 13.2.12
Field blanks	One per set of tests at each test location.	Ontario Hydro Section 13.4.1
Laboratory activities		
Assess reagent blank levels	Target <10% of sample value or <10x instrument detection limit. Subtract as allowed.	Ontario Hydro Section 13.4.1
Assess field blank levels	Compare to sample results. If greater than reagent blanks or greater than 30% of sample values, investigate. Subtraction of field blanks not allowed.	Ontario Hydro Section 13.4.1
Duplicate/triplicate samples	All CVAAS runs in duplicate; every tenth run in triplicate. All samples must be within 10% of each other; if not, recalibrate and reanalyze.	Ontario Hydro Section 13.4.1

6 DESCRIPTION OF TESTS

Personnel from METCO Environmental arrived at the plant at 12:00 p.m. on Wednesday, October 6, 1999. After meeting with plant personnel and attending a brief safety meeting, the equipment was moved onto the Unit Number 2 Baghouse Primary Inlet Duct and Stack. The preliminary data was collected. The equipment was secured for the night. All work was completed at 7:00 p.m.

On Thursday, October 7, work began at 7:00 a.m. The equipment was prepared for testing. Testing was delayed until the unit was adjusted to the proper operating condition. The first set of tests for mercury began at 12:40 p.m. Testing continued until the completion of the second set of tests at 8:00 p.m. The samples were recovered. The equipment was secured for the night. All work was completed at 9:30 p.m.

On Friday, October 8, work began at 6:30 a.m. The equipment was prepared for testing. The third set of tests for mercury began at 7:36 a.m. and was completed at 10:10 a.m.

The samples were recovered. The equipment was moved off of the sampling locations and loaded into the sampling van. The samples and the data were transported to METCO Environmental's laboratory in Dallas, Texas, for analysis and evaluation.

METCO ENVIRONMENTAL

Operations at Texas-New Mexico Power Company, TNP-One, Unit Number 2 Baghouse Primary Inlet Duct and Stack, located in Bremond, Texas, were completed at 1:00 p.m. on Friday, October 8, 1999.

Billy J. Mullins, Jr.

Billy J. Mullins, Jr. P.E.
President

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7 APPENDICES

A. Source Emissions Calculations

B. Field Data

C. Calibration Data

D. Analytical Data

E. Unit Operational Data

F. Chain of Custody Records

G. Resumes